GE Power Controls

STATIC
SOFT STARTER

ASTAT-SD

USER MANUAL

REMARKS :

1. Read this manual throughly before using the ASTAT-SD, and store in a safe place for reference.
2. Make sure that this manual is delivered to the end user
3. **CE MARKING**
   When using ASTAT-SD in the EU, compliance with EMC is required.
   ASTAT-SD is according with the generic EN 50081-2 and EN 50082-2

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1. Types and powers

1-1. IEC Ratings

Current rating	Max. starting current	Standard duty (300%, 30 sec.) 220V / 240V	380V / 415V	440V	480V / 500V	Heavy duty (450%, 30 sec.) 220V / 240V	380V / 415V	440V	480V / 500V	Degree of protection	TYPE (1)	Cooled
A	A	kW HP	kW HP	kW HP	kW HP	kW HP	kW HP	kW HP	kW HP			
5	25	1,1 1,5	2,2 3	2,2 3	3 4	1,1 1,5	2,2 3	2,2 3	3 4	IP-20	**QS □ BNA**	Natural
9	45	2,2 3	4 5,5	4 5,5	5,5 7,5	2,2 3	4 5,5	4 5,5	5,5 7,5	IP-20	**QS □ DNA**	Natural
12	60	3 4	5,5 7,5	6,3 7,5	7,5 10	3 4	5,5 7,5	6,3 7,5	7,5 10	IP-20	**QS □ FNA**	Natural
16	80	4 5,5	7,5 10	7,5 10	10 13,5	3,7 5	6,3 7,5	7,5 10	10 13,5	IP-20	**QS □ GNA**	Natural
22	110	5,5 7,5	10 13,5	11 15	13 18	5,5 7,5	10 13,5	11 15	13 18	IP-20	**QS □ HNA**	Natural
34	170	7,5 10	15 20	18,5 25	20 25	7,5 10	15 20	17 20	20 25	IP-00	**QS □ INA**	Natural

1-2. UL Ratings

Current rating	Max. starting current	Standard duty (300%, 30 sec.) 200V	230V	460V	Heavy duty (450%, 30 sec.) 200V	230V	460V	Degree of protection	TYPES (1)	Cooled
A	A	HP	HP	HP	HP	HP	HP			
5	25	1	1	3	1	1	3	IP-20	**QS □ BNA**	Natural
9	45	2	2	5	2	2	5	IP-20	**QS □ DNA**	Natural
12	60	3	3	7,5	3	3	7,5	IP-20	**QS □ FNA**	Natural
16	80	3	5	10	3	5	10	IP-20	**QS □ GNA**	Natural
22	110	5	7,5	15	5	7,5	15	IP-20	**QS □ HNA**	Natural
34	170	10	10	25	7,5	7,5	20	IP-00	**QS □ INA**	Natural

(1) Replace □ by one of the following numbers, according line voltage :

1 = 200 - 440 V

2 = 460 - 500 V

2. Technical specifications

2-1. General specifications

Control Specifications	Control system		Digital system with microcontroller. Starting ramp with progressive increase in voltage and current limitation
	Initial voltage (pedestal)	%	40 - 90 Un
	Starting torque	%	15 - 80 $M_{direct\ start}$
	Kick start	%	90 Un (80% $M_{direct\ start}$), 400ms
	Current limitation		2 to 5 x In
	Acceleration ramp time	s	0,5 to 60
	Energy savings		Output voltage reduction according to power factor
	Override		Fixed output voltage permanently equal to supply voltage
	Deceleration time by ramp	s	max. 2 x t acceleration ramp (as per energy savings state)
Operation	External control		Start - Stop
	Acceleration phase		Adjustable time
	Permanent phase		Energy savings / override choice
	Stop phase		Power cut-off / ramp choice
Inputs / Outputs	Inputs		2 optical couplings for Run / Stop commands
	Outputs		1 relay for Run / End of ramp (1NO) - Selectable
Protections	Current limit		Adjustable from 2In to 5In
	Loss on input phase	s	Trip at 3
	Thyristor short circuit	ms	Trip at 200
	Loss on output phase	s	Trip at 3
	Supply frequency error	Hz	If f < 48 ór f > 62, will not start
	Error (CPU)	ms	60
Environmental conditions	Temperature	°C	0 to +55 (1)
	Relative humidity	%	95 without condensation
	Max. altitude	m	3000 (2)
	Mounting positions		Vertical
Description of terminals	**1L1, 3L2, 5L3**		Power supply inputs (max. 440 or 500 V, according Types) +10%, -15%
	2T1, 4T2, 6T3		Outputs to motor
	A1 / A2 , B1 / B2		Command supply inputs (110/120 - 220/240V AC) +10%, -15%
	11, 14		Run/End of ramp internal relay output (1NO)
	1, 57		Run command input
	2, 57		Stop command input
	3, 4		For future use
Output contact specs.	Max. usage voltage	Vac	380
	Thermal current Ith	A	8
	Usage specifications		
	AC-15	V/A	220 / 3 - 380 / 1
	DC-15	V/A	max. 30 /3.5

(1) Derate output current by 1,5% / °C above 45°C

(2) Derate output current by 1% / 100m above 1000 meters

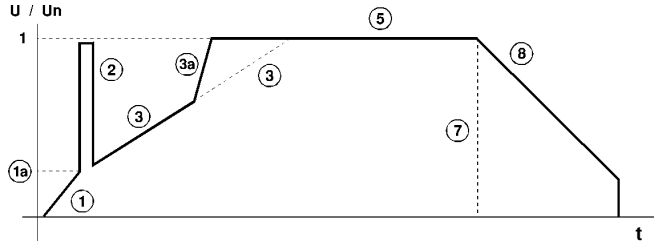
2-2. General specifications

Operating modes

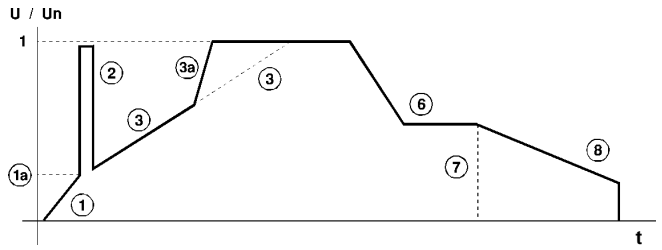
Initial ramp	(1)	5 main frequency cycles
Initial voltage (pedestal)	(1a)	40 to 90% Un (adjustable)
Kick start	(2)	90% Un (choice)
Acceleration ramp (t_{ramp})	(3)	0.5 to 60s (adjustable)
	(3a)	Fast increase of output voltage when the motor reaches rated speed
Current limit	(4)	2 to 5 In
Permanent state Choice	(5)	Nominal voltage (Override)
	(5a)	Nominal current
	(6)	Energy savings
Brake Choice	(7)	Motor power cut-off (stopped by inertia)
	(8)	Deceleration ramp. Max. time 2 x t_{ramp}
	(8a)	Evolution of current in deceleration ramp mode

Starting by voltage ramp

Override

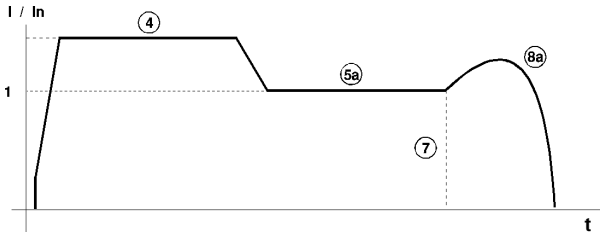


Energy savings

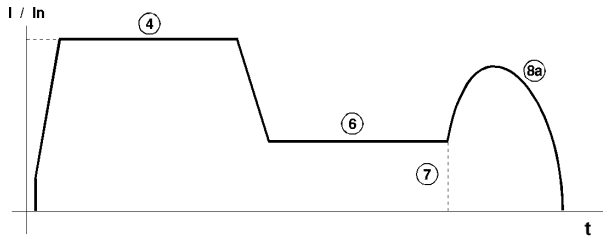


Starting by current limitation

Override

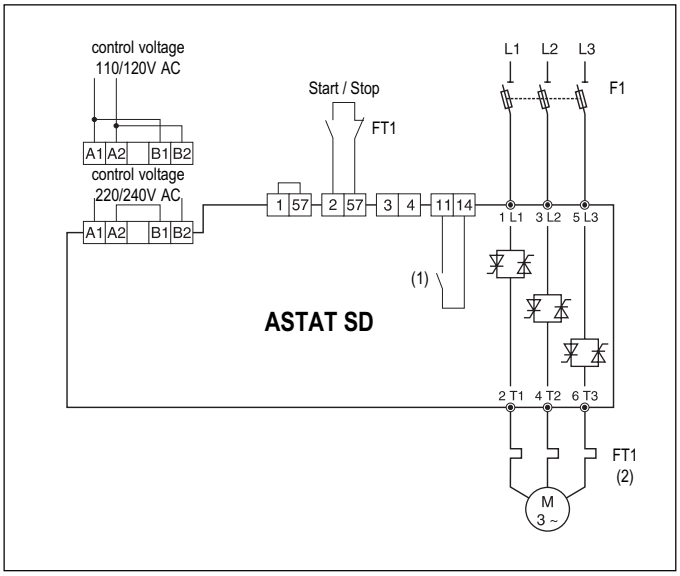


Energy savings

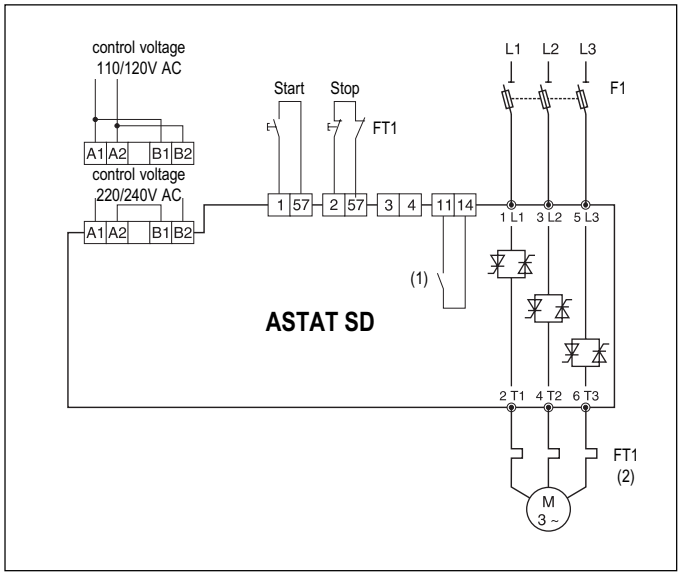


2-3. Recommended diagrams

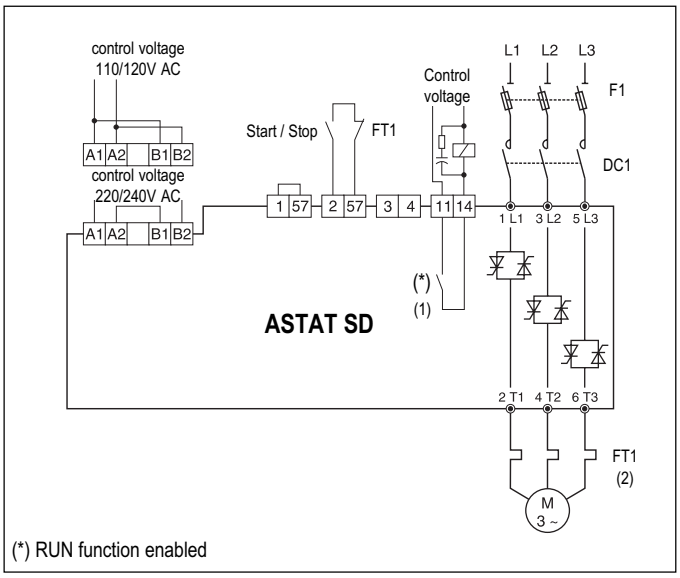
Permanent contact



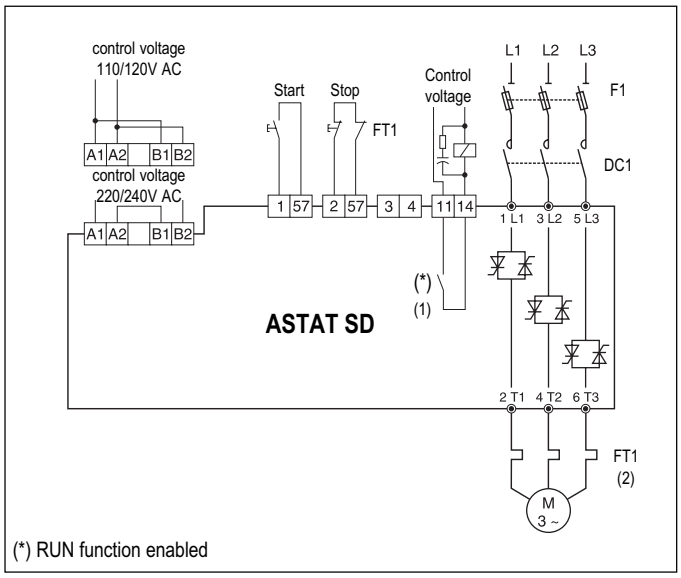
Contacts with pulse function



Permanent contact with line contactor



Pulse function with line contactor



(1) These contacts allow for direct action on contactors up to type CL10A at 220V AC. See usage characteristics for determining the need for an auxiliary relay

(2) Use thermal relay if required by local rules, selecting it according to motor current

3. Start-up

3-1. Equipment installation

CAUTION! DISCONNECT POWER BEFORE INSTALLING OR SERVICING

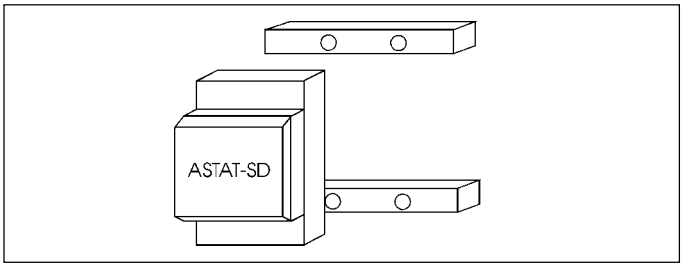
ONLY SPECIALIZED PERSONNEL SHOULD INSTALL THE EQUIPMENT AND ONLY AFTER HAVING READ THIS USER'S GUIDE.

THE USER ITSELF IS RESPONSIBLE FOR ANY PHYSICAL INJURY OR MATERIAL DAMAGE RESULTING FROM MISHANDLING THE EQUIPMENT.

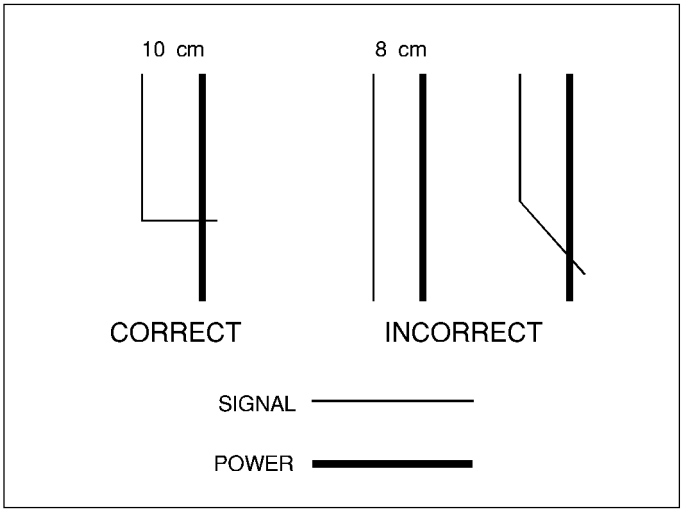
IF YOU HAVE ANY DOUBTS ABOUT ANY PROCEDURE, PLEASE CONTACT YOUR DEALER.

When installing equipment, keep the following points in mind

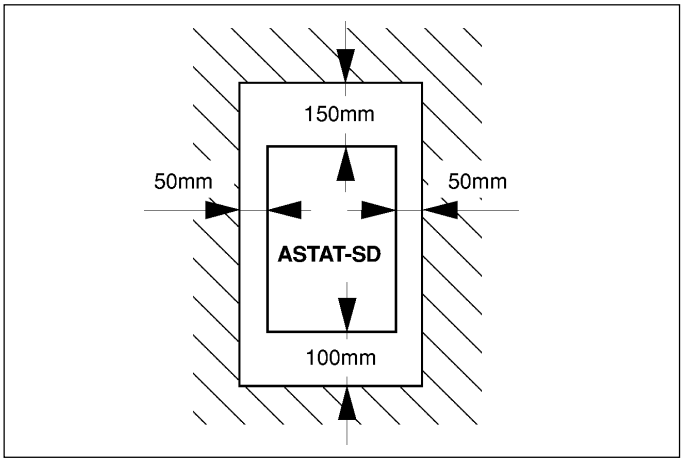
- The equipment should be installed vertically and hang over a platform or bars. The vertical position is essential for proper cool air circulation



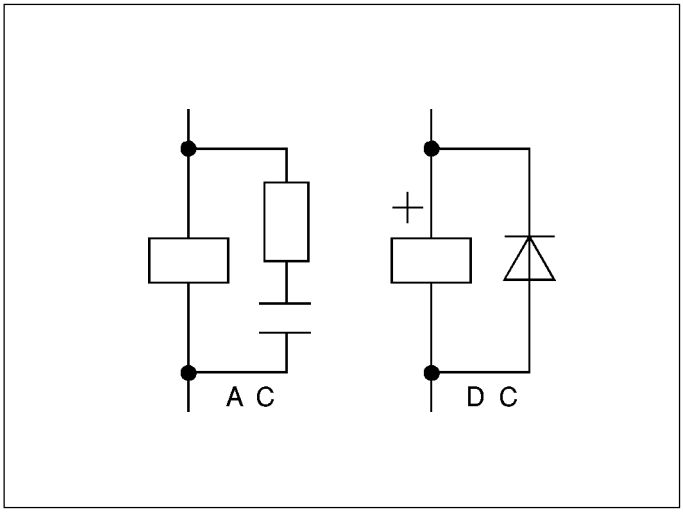
- Do not install equipment in environments containing explosive or flammable gases, or near important heat sources
- When equipment is to be mounted on a platform subject to strong vibrations, there should be an elastic base to protect the equipment.
- Do not install capacitors to correct the power factor between equipment output and motor
- Signal wiring should be no longer than 5m, and should be separate from power wires (line, motor, command relays, etc.) by at least 10cm, and if they cross, they should do so at a 90º angle



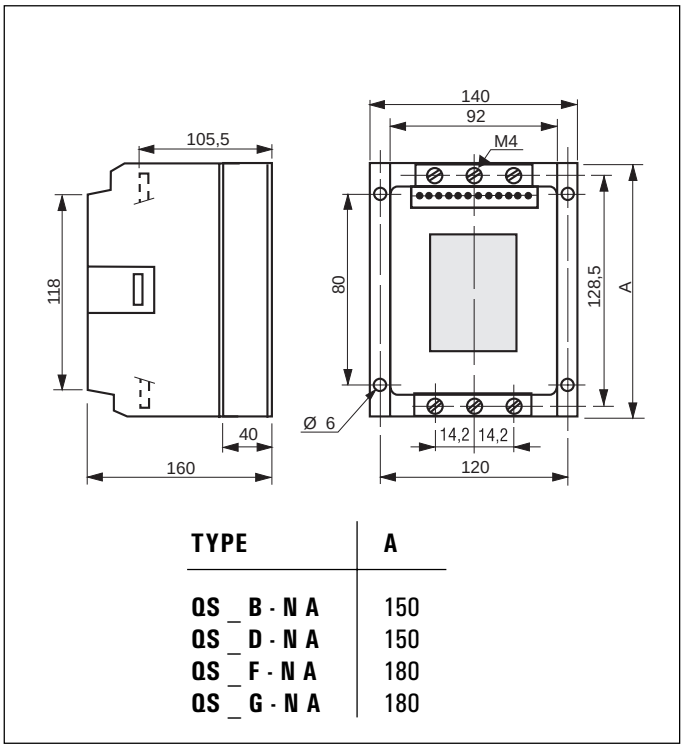
- Equipment should be well ventilated, at least keeping clearances as indicated in the following illustration.



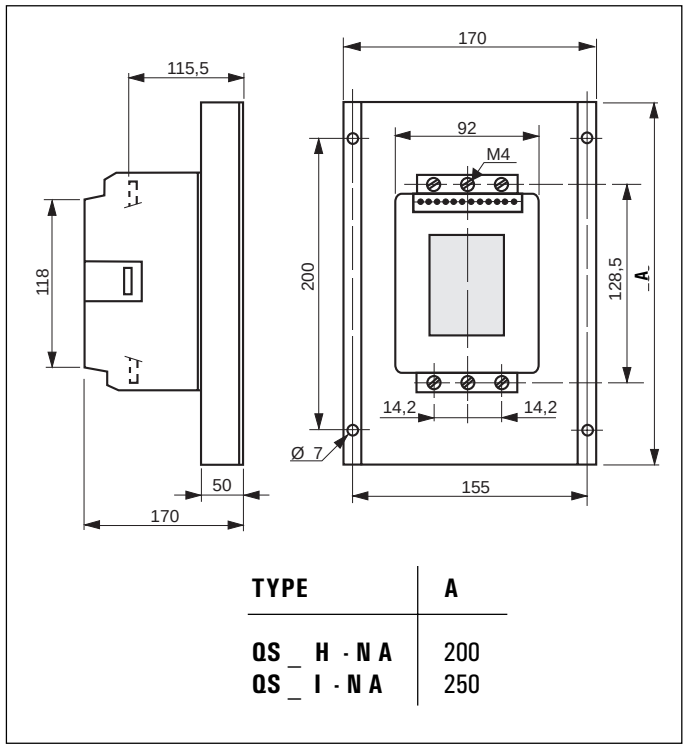
- Relays and contactors located in the same housing as the equipment should have an RC suppressor parallel to the coil (or a reverse diode, if controled by DC).



3-2. Dimensions



TYPE	A
QS _ B - N A	150
QS _ D - N A	150
QS _ F - N A	180
QS _ G - N A	180



TYPE	A
QS _ H - N A	200
QS _ I - N A	250

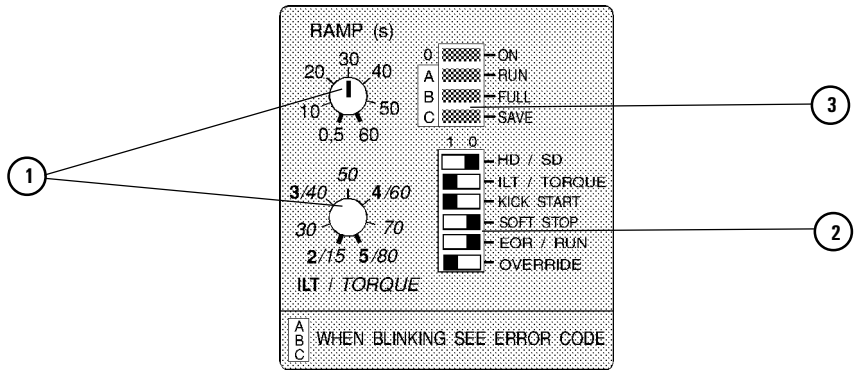
3-3. ASTAT-SD total losses at 100% rated current

TYPE	Power losses at 100% rated current W	Control circuit losses W	Total losses Power & Control W
QS _ B - N A	15	2	17
QS _ D - N A	29	2	31
QS _ F - N A	35	2	37
QS _ G - N A	47	2	49
QS _ H - N A	73	2	75
QS _ I - N A	84	2	86

3-4. Fuses and isolation contactor selection guide

TYPE	Isolation contactor	Fuses aM A	Semiconductor fuses Ferraz type (xx = according to design)	Semiconductor fuses Bussmann type (typower Silcu 660V ~)
QS _ B - N A	CL00	12	6,600 CP URD 22-58/32	Size = 00, In = 32A
QS _ D - N A	CL00	16	6,600 CP URD 22-58/32	Size = 00, In = 32A
QS _ F - N A	CL01	20	6,600 CP URC 14-51/40	Size = 00, In = 40A
QS _ G - N A	CL02	25	6,6 URD 30 xx 0063	Size = 00, In = 50A
QS _ H - N A	CL03	32	6,6 URD 30 xx 0080	Size = 00. In = 80A
QS _ I - N A	CL04	63	6,6 URD 30 xx 0100	Size = 00, In = 100A

3-3. Control panel description



Potentiometers (1)

ILT / TORQUE	- Current limit (2 - 5 Ir) / Starting torque (15 - 80% DOL), according to dip-switch ILT / TORQUE
RAMP	- Acceleration ramp time (in seconds) (t_{ramp})

Dip-Switches (2)

	Position	Function
HD / SD	**1**	- For future use
	0	- For future use
ILT/ TORQUE	**1**	- Select ILT / TORQUE potentiometer as current limit level
	0	- Select ILT / TORQUE potentiometer as initial torque level
KICK START	**1**	- Kick start function ON. When started, equipment generates a 0.9 Un voltage pulse for 400ms duration and later continues with the preselected starting torque and ramp time.
	0	- Kick start function OFF.
SOFT STOP	**1**	- Soft stop. Upon receiving stop command, equipment stops by decreasing voltage ramp in a time frame that depends upon the energy savings state selected by stop command (max. 2 x t_{ramp}).
	0	- No soft stop. Equipment stops by power cut-off by receiving stop command.
EOR / RUN	**1**	- Select internal relay (terminals 11-14) as Up to speed relay: contact 11-14 closes when the starting ramp voltage reaches end of ramp
	0	- Select internal relay (terminals 11-14) as RUN relay: contact 11-14 closes when the RUN order is given to the unit, and opens either the STOP order is given or an error is found
OVERRIDE	**1**	- Override function ON. There is not energy saving
	0	- Override function OFF. There is energy saving

LED's (3)

○ OFF
● ON
⊗ ON / OFF
◐ BLINKING

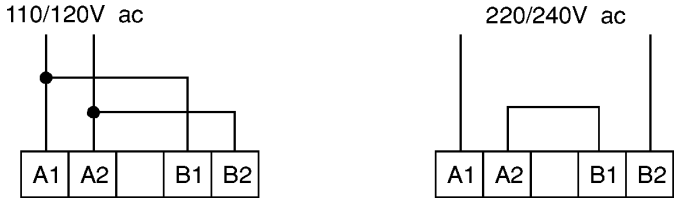
0	A	B	C	OPERATION CODE
●	⊗	⊗	⊗	Equipment is connected to main supply
●	●	⊗	⊗	Run
●	●	●	⊗	End of ramp
●	●	●	●	Effective energy saving
●	○	●	○	Stop order

0	A	B	C	ERROR CODE
●	●	◐	○	Frequency out of range
●	●	◐	●	Phase sequence lost
●	◐	○	○	Loss of synchronism
●	◐	●	○	U phase scr
●	◐	○	●	V phase scr
●	◐	●	●	W phase scr
●	●	○	◐	Phase U lost
●	○	●	◐	Phase V lost
●	●	●	◐	Phase W lost
●	●	◐	◐	Internal error

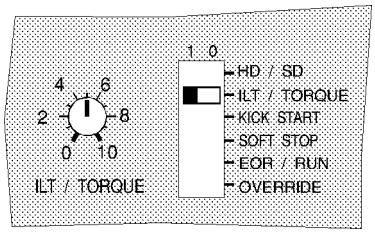
3-4. Start-up

- Make sure equipment wiring corresponds to one of the recommended routing diagrams or equivalent

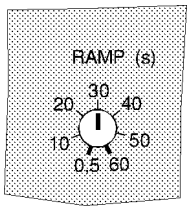
- Make sure the control wiring corresponds to the control voltage used.



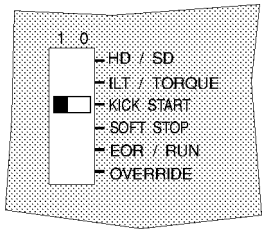
- Set starting parameters according to your application:



Voltage ramp or current limit

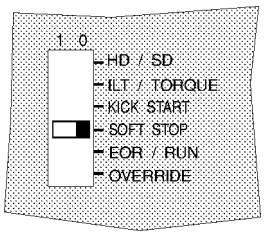


Acceleration ramp time



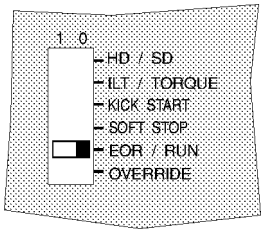
Kick start feature

- Set braking paramete according to your application:

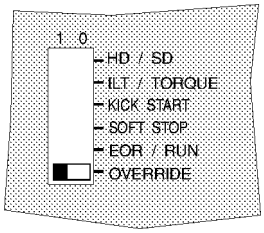


Soft stop / Power cut-off

- Set the rest of the parameters as needed:



Select relay output (contact 11-14) as RUN or End of Ramp (up to speed) relay



Select full voltage or energy saving at steady state

- Send run command to equipment and make sure that operation is correct.

3-5. Error detection

Symptom or Error	Possible Cause	Measures to be taken
LED "0" off	No control voltage	Check wire harness and control voltage
	Defective control PCB,s	Change control PCB,s
Equipment does not respond to STOP / START controls	Defective control PCB,s	Change control PCB,s
Frequency error (admits 48Hz < f main < 62Hz)	No **1L1** phase or frequence is out of range	Check **1L1** phase and/or main frequence
Phase sequence loss	Disturbance in mains supply	Check notches or dropouts in power line
	Defective thyristor	Check thyristors
	No input phases	Check **1L1, 3L2** and **5L3** phases
Synchronism loss	Phase **1L1** lost	Check **1L1** phase
Phase U, V, W thyristor	Shortcircuited thyristor	Check thyristor module
	No output phases	Check **2T1, 4T2** and **6T3** phases
No phase U, V, W conduction	No input / output phases	Check power wire harness for **1L1, 3L2, 5L3, 2T1, 4T2** and **6T3**
	Defective thyristor or bad wire harness	Verify gate and cathode wire harness. Verify thyristors
Internal failure	Microcontroller malfuanction	Check that IC2 are correctly inserted in its socket

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Blackwater Industrial Estate
Camberley
Surrey GU15 3DT

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